Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 1. This sheet, which includes Fig. 1, replaces the original sheet including Fig. 1. In Fig. 1, the reference numeral (27) was added to designate an interior housing passage which was shown in Fig. 1, but not previously indicated by a reference numeral.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS/ARGUMENTS

Claims 1-32 are pending in the present application. Claims 1, 13 and 23 were each amended to more clearly recite the present invention.

No new matter was added. Withdrawal of all objections and rejections is respectfully requested for the reasons set forth below.

Objections to the Drawings

In paragraph 1 on page 1 of the office action, the drawings were objected to under 37 CFR 1.83(a) for assertedly not showing every feature of the invention specified in the claims. Specifically, it was stated that the "*passage* formed in the housing for receiving the discharge fluid from port", as recited in claims 2, 14 and 18, must be shown or the features cancelled from the claims.

Submitted herewith is an amended Figure 1 that includes a new reference numeral (27) to designate the internal housing passages that was depicted in the drawing, but not previously indicated. Although the original specification stated that the passages were "not shown", it is clear to a person skilled in the art of compressors or other fluid machinery that the passage now indicated by the reference numeral "27" is actually an end portion of an axially extending passage that is fluidly connected with the "radially extending discharge passage (34)" (see Paragraph [0011]. As Applicant believes that this passage portion could not reasonably be any other passage or opening described in the application, Applicant respectfully requests the entry of this drawing amendment. If the entry of this Amendment is approved, then Applicant believes that the drawing objection concerning a "passage formed in the housing" becomes moot, and should then be withdrawn.

In paragraph 3 on page 1 of the office action, the drawings were also objected to under 37 CFR 1.84(p)(5) for failing to include a reference sign(s) mentioned in the description, specifically "a radially extending drain connection (42)" as discussed on page 3, line 1.

Applicants respectfully wish to point out that reference sign (42) does in fact appear in the drawing figures, specifically in Fig. 1. Referring to Fig. 1, this reference sign is located in the left, lower half section of the drawing figure, and is used to indicate a radial passage extending through the housing (12), the reference numeral (12) be located in relatively close proximity to the reference sign (42). In view of the preceding, Applicants respectfully request

withdrawal of the objection to the drawings under 37 CFR 1.84(p)(5). However, if the Examiner's copy of Fig. 1 in fact does not include the reference numeral 42 in this location, Applicant requests the opportunity to submit an additional amendment to Figure 1.

Claim Rejections under 35 USC § 102

In paragraph 3 on page 3 of the office action, claims 1-9 and 11-21 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 2,716,861 of Goodyear ("Goodyear") or alternatively under U.S. Patent 2,745,355 of Mosbacher ("Mosbacher"). As Applicant believes that neither reference discloses or even suggests all the limitations of the independent claims, Applicant respectfully traverses this rejection.

The Prior Art

Goodyear

Goodyear discloses a "pressure energy translating device", such as a pump, compressor, blower or exhauster (Col. 1, lines 15-18), which includes a rotor (11) rotatably mounted in a chamber (24) of a casing (12) and at least one rotatable wheel or disk (17) engaged with the rotor (11) (see Col. 4, lines 61-71; Figs. 1-17). The casing (12) has an inlet chamber (21) and an outlet chamber (23) which are interconnected by the rotor chamber (24) (Col. 4, lines 68-71; Fig. 1), which is preferably lined with a resilient coating (29) (Col. 5, lines 20-27). In operation, liquid is conveyed from the inlet chamber (21) to the outlet chamber (23), or vice-versa, by passing axially through the rotor chamber (24), which may compress or expand the liquid depending on the structure of the rotor (11) (see Col 5, line 42 - Col. 6, line 62).

Mosbacher

Mosbacher teaches a gear type pump or fluid motor that basically includes a pair of spaced spur gears (10), (11) spaced by a separator plate (12) and an endless flexible belt (15) disposed about the gears (10), (11) and plate (12), such that teeth on the belt (15) drive the gears (10) (11) to rotate about generally parallel axes (see Col. 2, lines 14-26; Figs. 1 and 2). The gears and belt are disposed within a chamber (25) formed in an intermediate casing member (21) and bounded by end plates (19), (20). Fluid enters into the intermediate casing member (21) through an inlet passage (33), passes through to a first low pressure passage (34) communicating

with the gear (11) and through an internal passage (35) to a second low pressure passage (36) communicating with gear (10) (see Col 2, line 69 - Col. 3, line 24). Fluid then flows axially from the two low pressure passages (34), (36) through one side "opening" of the endless belt (15) to enter the spaces between the belt (15) and the gears (11), (10), respectively, such that the fluid is compressed between the belt teeth and the gear teeth (see Col. 3, lines 50-69; Figs. 1 and 2). The compressed fluid then passes out through the other side opening of the belt (15) to a proximal one of two high pressure passages (38), (39) formed in the casing member (21), thereafter flowing out of casing member through an outlet passage (37) (see Col. 3, lines 25-69; Figs. 1 and 2).

Two other embodiments shown in Figs. 3-4 include three gears (80, 81, 82) or four gears (50, 51, 52, 53) driven by belts (89), (59), respectively, such that the gears are driven about generally parallel axes (see Col 4, line 24 - Col. 5, line39; Figs. 3 and 4). In a fourth embodiment, two gears are driven (110), (111) are disposed within a toothed belt (112) and spaced by a separator plate (113), and one or two other gears (123) may be located externally of the belt (112) and driven to rotate by teeth extending from the outer surface thereof (see Col. 6, lines 16-41; Fig. 5). The other embodiments function in a generally similar manner as the first embodiment.

The Present Invention

The present invention is directed to a compressor (10) that basically comprises a housing (12) having a bore (12a), a cylindrical liner (26) disposed within the bore (12a), a first rotor (24) disposed within the liner (26) and at least one second rotor (66) mounted within the housing (12) and engaged with the first rotor (24) to compress fluid between the engaged rotors (24), (66). More specifically, the liner (26) is disposed on the inner surface of the housing (12) defining the bore (12a) and has a generally cylindrical wall portion (see, e.g., Figs. 1 and 2), and at least one slot (26a) and at least one discharge port (26b) each extending generally radially through the wall portion (Pars. [0010] and [0013]). The first rotor (24) is mounted for rotation in the housing (12) and has at least one groove (see Par. [0018]; Fig. 5) for receiving fluid and being disposed within the liner (26) such that an outer surface of the rotor is in a closely spaced relation to the inner surface of the liner (26) (Pars. [0010] and [0018]). Further, the at least one second rotor (66) or/and (72) has a portion extending through the slot (26a) in the liner (26) and intermeshes with

the at least one groove of the first rotor (24) so as to compress fluid introduced between the rotors (24) and (66 or/and 72) and to direct the compressed fluid generally radially through the at least one discharge port (26b) in the liner wall portion (see Pars. [0015], [0016] and [0018]; Figs 1, 3 and 5).

Rejection under Goodyear

Claims 1-9 and 11-22 are not anticipated by Goodyear as the cited reference fails to teach or suggest several features of the present invention as recited in independent claim 1. First, Goodyear does not teach or even suggest a compressor that includes "a liner disposed on the inner surface... [of a housing bore] having a wall portion and ... at least one discharge port ... extending generally radially through the wall portion" as recited in independent claims 1 and 13 as amended. As discussed above, the present invention includes a liner (26) having at least one slot (26a) and at least one discharge port (26b) that extends radially through the cylindrical or tubular wall that provides the liner body (see, e.g., Fig. 2). The discharge port (26b) permits fluid to be discharged from inside the liner (26) to flow radially outwardly to a discharge passage (34) (see Pars. [0013] and [0018]), and as such, the operating parameters of the compressor (10) can be changed by replacing the liner (26) with another liner (26) having a differently sized or located discharge port (26b) (see Par. [0019]).

Goodyear discloses an energy translating device including a casing (12) having a rotor (11) disposed with in a chamber (24) that is lined with a resilient coating (29), which operates by drawing in liquid from an inlet chamber (21) at one axial end of the chamber (24) and discharging compressed liquid to an outlet chamber (23) at an opposing axial end of the chamber (24). As the liquid flows essentially axially through the chamber (24) (i.e., along the axis of rotation of the rotor (11)), Goodyear clearly does not disclose or even suggest a liner with a discharge port extending radially therethrough.

Second, Goodyear does not disclose or suggest a compressor that includes "a first rotor... [and], at least one second rotor ...intermesh[ed] with ... the first rotor so as to ...direct the compressed fluid generally radially through the at least one discharge port in the liner wall portion" as recited in independent claims 1 and 12 as amended. As discussed above, the first rotor and the at least one second rotor intermesh through a liner slot (26a) to compress fluid which is subsequently discharged radially through a discharge slot (26b) that is sized located

with respect to the slot (26a) to provide particular operating characteristics. Goodyear only teaches intermeshed rotor (11) and disk (17) which function to draw in liquid axially from an inlet chamber (21) and to discharge compressed liquid axially to an outlet chamber (23) (see, e.g., Col. 5, lines 42-45; Figs. 1, 2, 4, 5 and 14), and as such, the location of the "discharge port", i.e., the outlet of the rotor chamber (24), is clearly fixed or invariable. Thus, Goodyear clearly does not teach or suggest intermeshed rotors that compress fluid and discharge the fluid through a port extending radially through a liner.

For at least the above reasons, among others, the present invention as recited in independent claims 1 and 13 as amended is not anticipated by Goodyear, such that the rejection of amended claims 1 and 13 under 35 U.S.C. § 102(b) should be withdrawn. Further, as claims 2-9, 11 and 12 each depend from independent claim 1 and claims 14-21 each depend from independent claim 13, and claims 1 and 13 are not anticipated by Goodyear, the rejection of claims 2-9, 11, 12 and 14-21 under 35 U.S.C. § 102(b) should also be withdrawn.

Rejection under Mosbacher

Claims 1-9 and 11-21 are not anticipated by Mosbacher as the cited reference fails to teach or suggest several features of the present invention as recited in independent claim 1. First, Mosbacher does not teach or suggest a compressor that includes "a first rotor...[and] a second rotor having a portion ...intermeshing with the at least one groove of the first rotor so as to compress fluid introduced between the rotors" as recited in claims 1 and 13 as amended. In the present invention, the first or main rotor (24) has lobes (24a) which define a screw groove into which fluid flows, and at least one second rotor (66) or/and (72) has lobes (66a/72a) which enter the main rotor screw groove to compress the fluid therein (Par [0018]). In Mosbacher, each of the embodiments of the gear pump/motor has at least two spaced apart spur gears (e.g., gears (10) and (11)), which are spaced by a separator plate(s) (e.g., plate (12), and only are only drivingly coupled by an endless belt (15). Clearly, Mosbacher does not teach or even suggest a compressor having at least two rotors that intermesh to compress fluid located within a groove of at least one of the rotors.

Second, Mosbacher does not disclose or suggest a compressor that includes "a liner disposed on the inner surface... [of a housing bore] having a wall portion and at least one slot and at least one discharge port ... extending generally radially through the wall portion ...[such

that a] rotor ha[s] a portion extending through the slot in the liner" as recited in independent claims 1 and 13 as amended. As discussed above, the present invention includes a liner (26) having at least one slot (26a) and at least one discharge port (26b) that extends radially through the cylindrical or tubular wall that provides the liner body, the port (26b) permitting fluid to be discharged from inside the liner (26) to flow radially outwardly to a discharge passage (34). Mosbacher teaches gear pumps/motors with spaced rotors that do not intermesh and each has an endless belt (15) with two open side ends, such that fluid flows axially (i.e., along the axis of rotation of the gears and belt) into one side of the belt (15) and outwardly from an opposing side of the belt (15). Clearly, Mosbacher does not teach or even suggest a liner with a slot for permitting the intermeshing of rotors or a liner with a discharge port extending radially therethrough for discharging compressed fluid radially from the rotors.

For at least the above reasons, among others, the present invention as recited in independent claims 1 and 13 as amended is not anticipated by Mosbacher, such that the rejection of amended claims 1 and 13 under 35 U.S.C. § 102(b) should be withdrawn. Further, as claims 2-9, 11 and 12 each depend from independent claim 1 and claims 14-21 each depend from independent claim 13, and claims 1 and 13 are not anticipated by Mosbacher, the rejection of claims 2-9, 11, 12 and 14-21 under 35 U.S.C. § 102(b) should also be withdrawn.

Claim Rejections under 35 USC § 103

In paragraph 3 on page 5 of the office action, claims 10 and 23-32 were rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent 2,716,861 of Goodyear ("Goodyear") or alternatively under U.S. Patent 2,745,355 of Mosbacher ("Mosbacher"). As Applicant believes that neither reference discloses or even suggests all the limitations of the independent claims, Applicant respectfully traverses this rejection.

Rejection of Claims 10 and 22 under Goodyear and Mosbacher

Claim 10 depends from independent claim 1 and claim 22 depends from independent claim 13. As discussed in detail above, claims 1 and 13 as amended are each not anticipated by, and are patentable over, both Goodyear and Mosbacher. As such, claims 10 and 22 are also not anticipated by and are patentable over Goodyear and Mosbacher, such that the such that the rejection of claims 10 and 22 under 35 U.S.C. § 103(a) should be withdrawn.

Rejection of Claims 23-32 under Goodyear

The present invention as recited in claims 23-32 is patentable over the Goodyear as the reference fails to teach or suggest at least the following features of the method recited in independent claim 23. First, Goodyear does not teach or suggest a method of varying compressor operation that includes the step of "disposing a removable liner having a wall portion between a rotor and a housing" as recited in claim 23 as amended. In the present invention, the liner (26) is described as being replaceable with another liner having "slots and/or discharge ports of a different shape and/or location", such that a single compressor (10) may include two or more liners (26) of varying slot and port configuration each designed for a particular application of the compressor (see Par. [0019]). The variations of the shape and/or location of the slots (26a) and discharge ports (26b) change the such compressor operating parameters as discharge pressure, flow rate and flow capacity (see Par. [0019]).

Goodyear only discloses a pressure energy translating device having a rotor chamber (24) that may be lined or coated with a resilient material (Col. 5, lines 20-27). There is no description or depiction in the Goodyear reference that the liner/coating (29) being replaceable or removable from the chamber (24), and the use of the term "coating" implies that the resilient material may be bonded or adhered to the walls defining the rotor chamber (24). Further, as the liquid flows axially through the rotor chamber (24) and thus through axial ends of the lining (29), as discussed above, and not through one or more radially extending ports in a liner, the replacement of the liner (29) would not likely result in any significant variation of the operating parameters of the pressure energy translating device. Therefore, Goodyear clearly does not teach or suggest a removable liner.

Second, Goodyear does not disclose or even suggest a method of varying compressor operating characteristics that includes the step of "providing a discharge port in...[a] liner that extends generally radially through the liner wall portion to discharge the compressed fluid radially from the liner" as recited in amended claim 23. As discussed in detail above, Goodyear only teaches an pressure energy translating device that includes liner/coating (29) in a rotor chamber (24) and that operates by drawing/pushing fluid from an inlet chamber (21) to flow axially through the rotor chamber (24) to an outlet chamber (23). The liner/coating (29) does not have any radially extending discharge port, and fluid is not discharged radially from the rotor

chamber. Thus, Goodyear clearly does not teach or even suggest a step of providing a radial discharge port in a compressor chamber liner.

For at least the above reasons, among others, the present invention as recited in independent claim 23 as amended is patentable over Goodyear, such that the rejection of amended claims 23 under 35 U.S.C. § 103(a) should be withdrawn. Further, as claims 24-32 each depend from independent claim 23, and claims 23 is patentable over Goodyear, the rejection of claims 24-32 under 35 U.S.C. § 103(a) should also be withdrawn.

Rejection of Claims 23-32 under Mosbacher

The present invention as recited in claims 23-32 is patentable over the Mosbacher as the reference fails to teach or suggest at least the following features of the method recited in independent claim 23. First, Goodyear does not teach or suggest a method of varying compressor operation that includes the step of "providing a discharge port in...[a] liner that extends generally radially through the liner wall portion to discharge the compressed fluid radially from the liner" as recited in claim 23 as amended. Mosbacher only teaches gear pump having an endless belt (15) disposed about two or more gears, such that low pressure liquid flows axially into one open side of the belt (15) and is discharged axially through the opposing second open end of the belt (15), as discussed above. Clearly, the endless belt (15) of Mosbacher does not have any radially extending ports or slot, and the gear pump structure actually teaches against providing such any ports in the belt material itself. Specifically, as the belt (15) circles about the two or more gears (e.g., 10, 11), the location of such a port would constantly change, thus making it impossible to have a steady pump output as is generally required for any practical pump application.

Further, Mosbacher does not disclose or suggest "replacing...[a] liner with another liner having a discharge port that varies in location and/or size form the port of ... [a] first-mentioned liner" as recited in claim 23. There is no description or depiction in the Mosbacher reference that the endless belt (15) may be replaced with another belt to change the operating characteristics of any of the gear pumps. In fact, as each gear has a specified number of teeth of a fixed axial length, there is likely no way of significantly varying pump performance by replacing the endless belt (15) with a different belt. But more importantly, as there are no radially extending ports (or slots) through the wall of any of the described and depicted endless

belts (15), Mosbacher clearly could not teach or suggest the step of replacing a liner with a another liner having a radial port of a different location or/and size.

For at least the above reasons, among others, the present invention as recited in independent claim 23 as amended is patentable over Mosbacher, such that the rejection of amended claims 23 under 35 U.S.C. § 103(a) should be withdrawn. Further, as claims 24-32 each depend from independent claim 23, and claim 23 is patentable over Mosbacher, the rejection of claims 24-32 under 35 U.S.C. § 103(a) should also be withdrawn.

Conclusion

Therefore, it is respectfully submitted that all claims pending in the present Application are in condition for allowance. Reconsideration and allowance of pending claims is therefore respectfully requested.

If the Examiner believes an interview, either telephonic or in person, will advance the prosecution of this matter, it is respectfully requested that the Examiner contact the undersigned at the Examiner's convenience.

Philip A. Zarnoch, et al.

Respectfully submitted,

Date: May 12, 2006

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Annotated Sheet Showing Changes

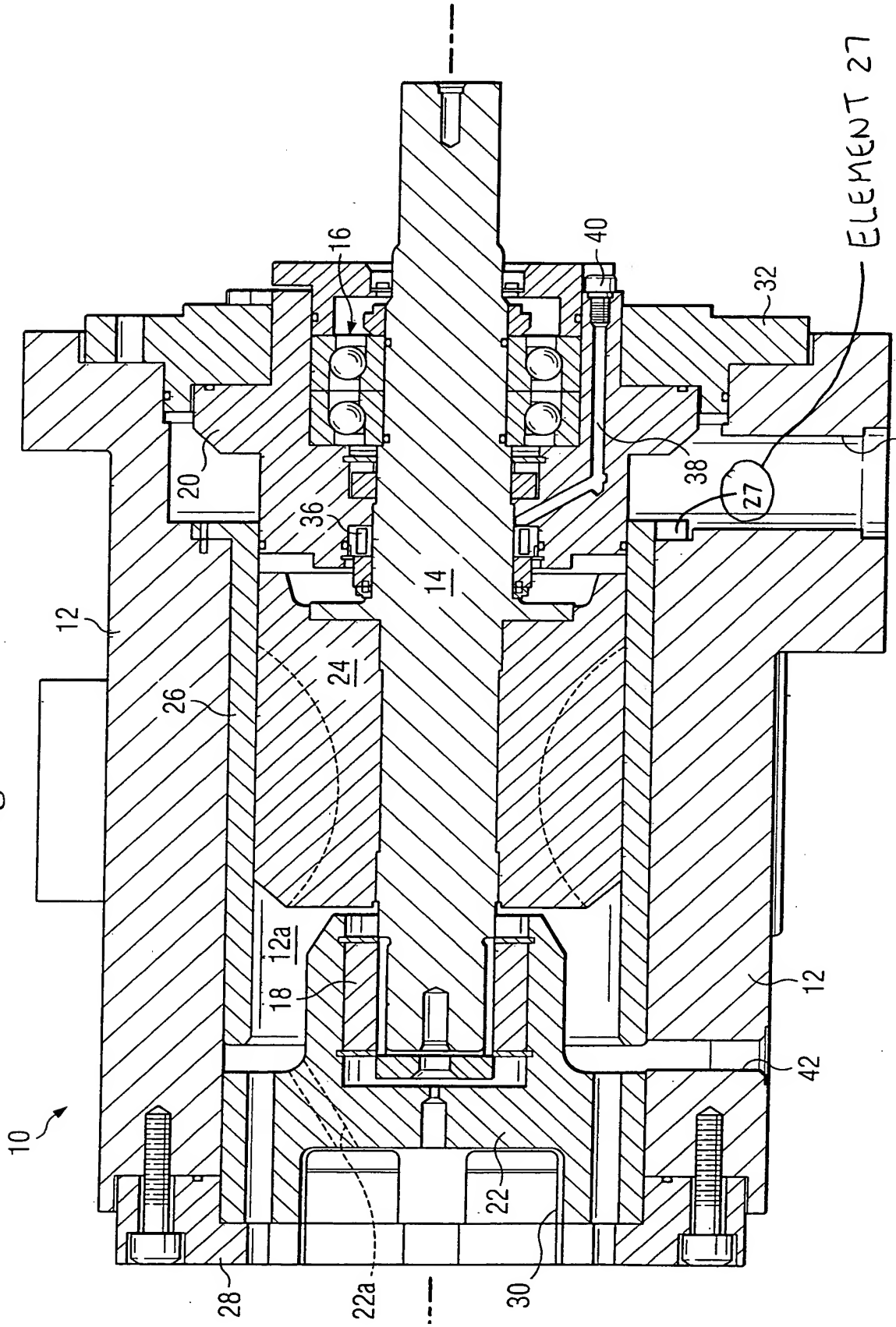

Fig. 1